STANDARD FORM NO. 64

CONFIDENTIAL 14-788 4p

Office Memorandum · UNITED STATES GOVERNMENT

TO : The Files [redacted] 11 : March : 1954 25X1

FROM : [redacted] 25X1

SUBJECT: Trip Report - Contracts PSC-148-UNV - PSC 184-UNV, and RD-16

1. A visit was made to the facilities of [redacted], 25X1
Illinois, 17 - 18 February 1954 to discuss RS-6 production problems and matters pertaining to the future production of the RS-6A.

2. Those present for a discussion of RS-6 production problems were:

[redacted]	Project Engineer	25X1
	Navy Inspector	25X1
[redacted]	CIA	
	CIA	
	CIA	

3. Of chief Agency concern is the excessive oscillator pulling and oscillator radiation found in current production equipments. This problem and others is discussed in detail in a report made by [redacted] and is 25X1
attached herewith. Essentially the radiation problem is this:

(a) It is believed, but not substantiated, that the critical lead dress of the oscillator and antenna circuitry had been changed on [redacted] electrical prototype and production which simultaneously 25X1
resulted in excessive oscillator pulling and excessive radiated interference.

(b) [redacted] had been advised of these deficiencies prior to our 25X1
visit and had attempted to remedy this fault by re-dressing the oscillator lead within the R. F. compartment, and re-dressing the antenna lead within oscillator compartment. [redacted] asked for 25X1
complete removal of such leads from their disassociated compartments. (In one set examined the oscillator lead was tucked inside the R.F. coil). When radiation interference tests were attempted it was found that the ambient noise level outside the screen room was 10,000 microvolts and it was decided to attempt such tests after the plant shut down. After the plant shut down these tests were again attempted and the results bore no significance to the problem at hand. It seemed apparent that the method of measuring radiation in accordance with JAN I-225 (specified for RS-6 and RS-6A) is subject to wide interpretation and not satisfactory for our purposes. It was decided to investigate this matter upon our return to Washington.

4. MIL-I-16910(SHIPS) is an excellent replacement for ~~MIL~~ JAN-I-225. This

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specification differentiates between conducted and radiated interference and prescribes the exact method of test. The frequency range is from 14 kilocycles to 1000 megacycles which permits radiation measurements within T.V. band. Some relaxation will be necessary for Agency equipment under the requirement of this specification. MIL-I-16910(SHIPS) stipulates receiver and transmitter ocsillator (key up) radiation as not to exceed 400 micromicrowatts and transmitter carrier radiation (other than fundamental) as down 50 decibels. The latter is considerably more stringent than the 5% of the fundamental presently specified for the RS-6.

5. Copies of MIL-I-16910(SHIPS) are being procured for the laboratory and it is contemplated that formal amendments to the RS-6 and RS-6A specifications will be made to include a conducted interference measurement and a radiation interference measurement with specific limits for low order harmonic radiation and additional limitations for radiation within the T.V. spectrum.

6. During the morning of 18 February 1954, a meeting was held to discuss matters concerning contractual business. Those present were:

[redacted] - [redacted] 25X1 25X1
- CIA
- CIA

This period was devoted chiefly to discussions relating to price quotations, changes and requests covered by formal correspondence.

[redacted] 25X1

Attachment: Trip Report - [redacted] 25X1

26 February 1954

Files, RS-6

[redacted] 25X1

Trip to [redacted] 25X1

REFERENCE: Contract PSC-148-UNV

1. Purpose of trip:

a. To discuss the means to be taken to reduce HFO radiation and oscillator pulling in both the RS-6 and the RR-6A.

b. To evaluate whatever steps had been taken at the contractor's plant to correct the above faults on the production line.

c. To evaluate the method of test used in connection with the measurement of HFO radiation.

d. To discuss any production problems with the contractor and the Navy Inspector.

2. On arrival at the plant we were met by the Navy Inspector and were escorted to the RS-6 production line. The following observations were noted:

a. The critical oscillator lead was not being dressed out of the RF compartment.

b. It was found that the 1% and the 5% tests (this includes the HFO radiation test) had been waived by the Government.

c. The Navy Inspectors had two complaints found in an average of one unit out of twenty. These were: low audio output of crystal calibration beats and attenuation of received signals on break-in operation.

3. Regarding the RS-6A, the contractor exhibited the steps he has taken to correct oscillator pulling and HFO radiation. These include the recommendations of the Government and additional isolation of the variable bias line. Steps had not been taken to correct the trouble in the RS-6. The improvements in both the above cases were explained in terms of the magnitude of the oscillator pull rather than in terms of oscillator radiation.

4. An investigation of the test used to measure oscillator radiation at the contractor's plant shows that the method is not adequate for measuring the radiation properties of a "Front End" deluged with oscillator voltage. The present method apparently effectively measures case radiation. The early RS-6 #2003 and the corrected units show that this is true. Even with a 27' antenna directly over the Stoddart loop, a corrected unit will not indicate antenna radiation above case radiation. The only reasonable method is to measure the oscillator directly on the receiver antenna terminals and to isolate the measuring instrument (receiver) from the case induction field. The method must be standard. The use of a Stoddart unit in a field check will be helpful.

5. As the amount of oscillator voltage found on the RF grid is directly proportional to the oscillator pulling, a shift of not more than 3 kc will be allowed temporarily, as a measure of oscillator radiation. This is good insurance, but is not a guarantee that the radiation is within limits. It is felt that a direct method of measurement is required. We propose taking the following steps:

a. We are sending the contractor a previously submitted prototype of the RR-6A for modifications to reduce HFO radiation and oscillator pulling.

b. After he has modified this unit in accordance with our recommendations and his further study, measurements will be taken here on the returned unit as per paragraph (d) below.

c. Institute a simple 100% factory comparison check, using the Stoddart if possible, to show that antenna radiation does not exceed case radiation.

d. We request that the 1% and 5% checks be performed by the contractor. For oscillator radiation tests we recommend the application of MIL-16410 and Amendment #2 (Fig. 39). It would be well to have the contractor set up for the above checks and have one of our people witness measurements on at least ten units from which a production limit in microwatts on the receiver primary antenna coils can be set. The oscillator pull should not be greater than 2 kc.

e. Institute a study at the laboratory to measure radiation in the field in order to study the effect of antenna radiation, case radiation, and HFO radiation of present agent equipment. Evaluate ease of DF.

6. The following items were mentioned by the Navy Inspectors as sources of trouble found in about one in twenty units:

a. The crystal calibration beats do not come through with sufficient audio power at the high end of the high band. [redacted] suggests by-passing the audio stage cathode resistor with a .001 uf condenser. This was found to be the solution for obtaining higher calibration oscillator output on the RO-6A. 25X1

b. There is an abnormal attenuation of signal fed through the transmitter relay on break-in operation in the receive position. The Navy Inspector will bring these units to the attention of [redacted] for evaluation. 25X1

c. The die cast receiver cases are coming in from the subcontractor with a small surface crack on the base casting just over the opening for the power plug stowage area. It was suggested to the Navy that these cases be rejected before the receiver is assembled, and that the subcontractor be further consulted and, if necessary, grind down the die in this area to build up the corner wall thickness.

[redacted] 25X1

OC-E/R&D/AJS/ljm

cc: OC-E
R&D
Chrono
Dev/s